

Livable Communities

Initiative Component	FY 2001 Program Change \$(000)	Page Reference
Community/Federal Information Partnerships	30,000	40
Urban Dynamics – Decision Support	10,000	44
Accessible Data Transfer	2,000	48
Landsat	5,000	50
Total	47,000	

"I finally understood the importance of materials flow in the sustainability discussion and I am already incorporating references to Industrial Ecology in my presentations on sustainability."

It "showed that while sediment retention has been perceived as a benefit of wetlands, the sediments can have very negative effects on wetland function. This will have an important effect on designing wetlands for water quality improvement."

"The information will play a useful role in designing long-term monitoring and research programs. Our programs are ... concerned with evaluating the long-term consequences of the Exxon Valdez oil spill on the living resources of Prince William Sound, Cook Inlet and the northwestern Gulf of Alaska."

"... They run a spectacular web site with great FTP access to all sorts of GIS data. If you need CD copies of items on the site to avoid download hassles you can get those too. This mix of free downloads and fairly priced reproductions is a good example of "customer" orientation without any bogus confusion between government and business."

"Information developed by this group will be very helpful in determining the impact of our management actions in northwest Oregon forests. The actions and decisions affected include timber sales, operation of recreation facilities, and maintenance of forest road systems and protection of important wildlife habitats. The associated issues are very important and the subject of public attention and debate. The research findings will help provide information on issues where very little scientifically credible information exists."

Community/Federal Information Partnership

+\$30.0 million

Issue

America's communities need spatially referenced environmental and natural resource data to make decisions that ensures quality of life and strong, sustainable economic growth. Communities' increased demand for these data provides opportunities to leverage Federal data investments, resulting in increased and current data coverage for communities and others. Cooperative data development aids collaborative decision making for issues of interest to communities and Federal agencies and helps to make Federal and State scientific data and expertise available to local communities. There has been concern over the accessibility of digital access in communities across the country. Some communities have good access; others have little to none. The Community/Federal Information Partnership (C/FIP) program begins to bridge this "digital divide."

USGS Role

USGS partnership programs share expertise and data essential to many environmental, natural hazard, and socioeconomic issues facing communities. Competitively awarded matching resources provided through C/FIP would enhance USGS efforts with local, State, and Tribal governments, the private sector, academia, and others to advance the capacity of communities to create and use spatially referenced data. The House Appropriations Committee endorsed this type of cooperation in its FY 99 report: "The Committee endorses the idea of the National Spatial Data Infrastructure (NSDI) and expects the Survey to expand the partnerships and cooperation with State and local governments and the private sector to create an NSDI" (House Interior Appropriations Subcommittee Report 105-609, FY 99). Efforts (\$25 million) will emphasize cooperative work by USGS and State partners to work with communities to develop, interpret, and use geographic, geologic, and biological data and to develop standards that help communities access and integrate these data. Remaining resources (\$5 million) will improve USGS capability to provide citizens spatially referenced earth and biological science information through the National Spatial Data Infrastructure (NSDI) and the National Biological Information Infrastructure (NBII).

Current Program

With funding provided by the General Services Administration (GSA), the Federal Geographic Data Committee (FGDC) sponsored six NSDI Community Demonstration Projects to support the use of geographic data for decisionmaking in local areas. Competitively awarded grants funded these pilot projects. USGS, through the FGDC, coordinated making GSA funding available to communities across the country to illustrate the use of geographic information and the benefits of improved liaison between Federal, State, and local communities. USGS served as a programmatic adviser on one of the six pilot projects, a project located in Gallatin County, MT. Each project addressed issues of specific concern to the local community, such as watershed and water quality management, disaster preparedness and recovery, urban growth and land use planning, and using geographic information for crime prevention. The success of these demonstration projects provided the framework for the development of the C/FIP initiative. See <http://www.fgdc.gov/nsdi/docs/comfedip.html> for more information on specific projects.

FY 2001 Program Change

The USGS requests an additional \$30 million for cross-program projects aimed at developing solutions for integrating base map data with geologic, biologic, hydrologic, soils, and land cover information. Funds totaling \$25 million for the Mapping Data Collection and Integration (\$10 million), National Cooperative Geologic Mapping Program (\$7 million), and Biological Information Management and Delivery (\$8 million) subactivities will be allocated through competitively awarded, matching grants and other cooperative mechanisms to fund community-based activities. Funds will support new research to collect geospatial data and provide technical assistance to effectively use this data.

This increase is part of the Administration's Lands Legacy initiative, State Planning Partnerships program. The additional funding will support the Lands Legacy's objectives, and in particular, help States and communities preserve local lands and habitat. C/FIP will assist State and local entities in land-use planning, and in identifying appropriate lands for acquisition and open space protection by developing, interpreting, and delivering geospatial information to communities.

Mapping Data Collection and Integration +\$10.0 million: The increase will provide competitively awarded matched funds to work with State and local governments to collect and integrate geospatial data such as orthoimage, elevation, and hydrography data. These standardized data types serve multiple purposes at all levels of government, such as the integration of elevation and hydrographic data for flood predictions. They also have myriad uses for management of government and private lands, environmental research and planning, hazards response, and commercial applications.

Earth Science Information Management and Delivery +\$2.0 million: The increase will improve Internet access (hardware and software) to enable citizens to readily tap USGS holdings of regional and State-based geographic, cartographic, and remote sensing information. These efforts will be accomplished in coordination with the Federal Geographic Data Committee and the National Spatial Data Infrastructure.

National Cooperative Geologic Mapping Program +\$7.5 million: The increase will be used to advance partnerships between the USGS, communities, State geological surveys and universities. The increase will expedite the development and production of new digital geologic maps and expansion of the Internet-based national geologic map database to meet needs specified by communities in the competitive C/FIP funding process. These scientific maps are needed by public- and private sector communities to reach informed decisions on water, environment, hazards, and land resource issues. However, ready access, objective interpretation, and effective communication are needed to apply these technical data to societal issues and decisions. Increased access through the geologic map database, effective public access and communication provided by the State surveys and community-based prioritization are hallmarks of this national geologic mapping effort to make relevant geologic map information available and useable by communities.

Energy Resources +\$0.5 million: The USGS, through its Energy Resources Program, has developed an Internet information distribution system, GEO-Data Explorer (GEODE), that serves both general interest and detailed project-level information representing the scientific breadth of the organization for use in decision making at the community level. The funds will be used to support State and local government efforts to integrate and analyze digital geospatial data needed for local land and resource management decisions using GEODE. These data sets may

include land ownership, resource distribution, satellite imagery, infrastructure networks, hydrology, zoning boundaries, and data from other USGS programs as needed. The system is designed for easy operation. At the first level, information from USGS fact sheets or national- and regional-scale maps of low resolution is made available through the click of a mouse button. The second level is designed for technical Internet users who may be interested in higher resolution data typically generated by USGS research projects and more advanced data mining and spatial capabilities.

Water Information Delivery +\$2.0 million: The increase will accelerate the process of providing more detailed stream and watershed "addresses" for the Nation. Much as a street address provides a commonly used means for locating buildings, standardized stream and watershed addresses provide a means for locating and sharing observations of the quantity or quality of surface waters and watershed conditions. Much of the work performed within this program would be aimed at defining a watershed address for every location in the United States. The address standard meets a critical need for improving the ability of Federal, State, local, and watershed based organizations to exchange information for better watershed management. The greater specificity of new codes for local watershed addresses will give much more detail in defining watershed information, thus helping citizens, scientists, and public officials to organize information about watershed conditions much more effectively. In addition, the program will significantly enhance the digital framework that defines the Nation's rivers. It would identify about 2 million river reaches, each with location information, relationship to the watershed units, and information on the upstream-downstream relationship of all of these river reaches. Much of this work would be performed by USGS, but some would be accomplished through existing and new partnership arrangements with a variety of other Federal and State agencies and academic institutions that are already doing some work in this arena.

Biological Information Management and Delivery +\$8.0 million: The USGS, through two key information programs, Gap Analysis (GAP) and the National Biological Information Infrastructure (NBII), provides a variety of broad-scale biological information to users across the country for help in making natural resource management decisions. This requested increase will enhance both of these programs by funding the cooperative activities of local communities, universities, State agencies, and others to collect and integrate local and regional-level biological data into the GAP and NBII systems. Emphasis will be on increasing the scope of data available from the Gap Analysis Program (+\$4.0 million) to include invertebrate species and freshwater aquatic environments building on pilots in Missouri and Ohio. The portion of the increase devoted to the NBII (+\$4.0 million) will be used to expand the current program by establishing information nodes for providing rapid, integrated access to detailed information on high priority biological science topics such as invasive species, Pacific salmon, and amphibians. Key partners in this initiative include: academic institutions, The Nature Conservancy, the International Association of Fish and Wildlife Agencies, and The Association of Systematics Collections. Geographic areas to be targeted include the Pacific Northwest, Southern Appalachia, Texas, California, and Hawaii.

Partners and Customers

The USGS partners with many organizations for geographic, geologic, biologic, and water data. State partners include geological surveys, State and regional fish and wildlife agencies, and natural heritage agencies. Other partners include private companies, universities, natural history museums, and regional and Federal agencies. C/FIP extends benefits of these partnerships to communities and establishes new partnership opportunities with communities.

Customers include organizations and individuals working on critical issues facing communities, such as land and water resource management, emergency response, transportation, economic development, and mitigation of risks from natural hazards. Shared map information on rivers and lakes help those interested in environmental issues share and relate observations and develop and understand options. C/FIP-sponsored partnerships can also provide communities with access to USGS technology and other resources. The USGS will use competitive “matching fund” grant programs and other partnership mechanisms to carry out the C/FIP initiative.

Products

- Communities in the lower Mississippi region, Great Lakes, southwest, southeast, and Pacific Northwest among other places, will be invited to participate in C/FIP in order to leverage other USGS scientific work in these areas.
- New orthoimage, elevation, geologic, biologic, and hydrographic data will be collected in cooperation with local communities to support their needs by creating new data products and digital maps.
- More detailed stream and watershed locator addresses for the Nation will be created, improving the ability of Federal, State, local, and watershed based organizations to exchange information for improved watershed management.
- Improved ability of communities to find and use a variety of biological data for a selected species, topic area, or geographic location.
- Improved integration of and Internet accessibility to the geospatial, hydrologic, biologic, coastal and marine, geologic map, and mineral resources long-term databases.
- Data holdings will be increased in the geospatial and geologic map databases, NSDI, and the NBII because of an increase in local community contributions.
- Better access will be provided to local watershed decision-makers so they can more easily tap the 40 long-term databases by local watershed address.
- Increased ability for USGS and partner agencies to deliver data and to make science information available and understandable to local communities through the Internet.
- Increased ability of USGS to deliver systematic analyses & investigations to local communities through the Internet.

Urban Dynamics – Decision Support

+\$10.0 million

Issue

A review of newspaper headlines around the country shows that traffic congestion, vulnerability to natural hazards (such as floods, fires, earthquakes), loss of open-space, air and water pollution, and other quality of life concerns are foremost in the public eye. At the same time Americans recognize that growth of urban areas creates jobs and places to live and contributes to economic well being. Hundreds of initiatives to address urban growth are on local and regional agendas around the country. Political leaders and policy and decision makers are under pressure to implement approaches and solutions that address environmental issues while stimulating economic growth and the vitality of their communities.

The growth of the Nation's urban and suburban regions is not a new phenomenon but is the consequence of a growing population that enjoys high per capita consumption of resources and increasingly resides in urbanized areas. Natural habitats are being changed and their interface with human habitats altered in ways that affect animal and plant communities. Sustainable sources of clean drinking water may be under stress in regions experiencing rapid growth. The availability and transportation of the natural resources necessary to fuel the growth of urban infrastructure (e.g., stone, gravel, and crushed rock) are directly affected by growth. For these and other reasons it is critical that the national consequences of urban change be understood to effectively manage urban growth in a manner that will maintain economic development and our natural resources for the future.

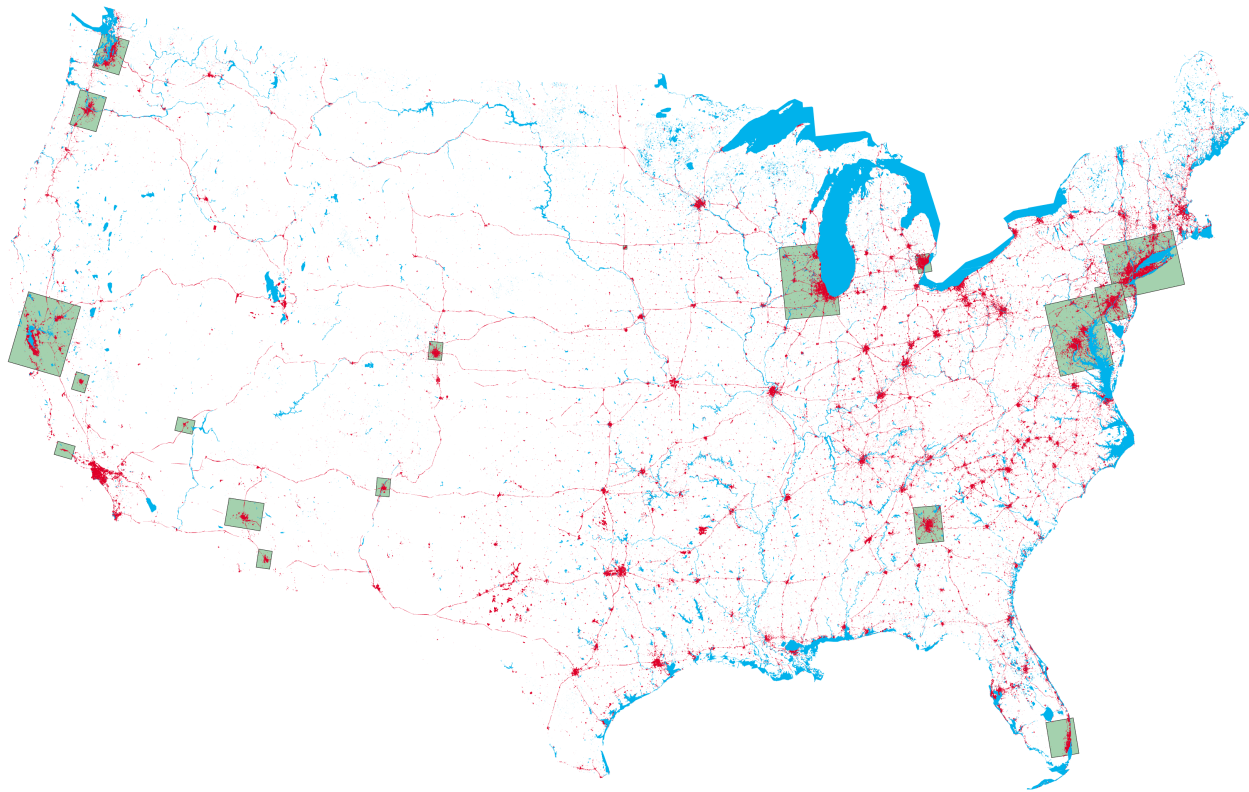
USGS Role

Through research and analysis, the USGS brings unbiased scientific observation and data to bear on these complex issues. The integration of scientific data, information, and understanding with the tools and methodologies for their effective application will help local leaders solve the complex issues they face. No other Federal agency or organization can contribute the breadth of scientific expertise at a regional scale.

These issues are not confined to one sector of society or one region, nor are they the responsibility of one Federal, State, local, non-profit, or private organization to address; rather, they affect all corners of the Nation and require the collective expertise of both the public and private sectors to control. As with most of its programs, the USGS will transfer the knowledge and experience gained in these investigations to others. With over 120 years of natural science data and information, the USGS is the largest holder of this type of earth science information. Through many national programs the USGS collects, analyzes, and distributes up-to-date information about the Nation's natural resources.

Current Program

The USGS is addressing the dynamics of urban environments through a four-component program that involves (1) compilation of historic, retrospective data on growth at regional scales around the nation; (2) geographic analysis to reveal the rates, patterns, trends, causes, and consequences of the documented growth; (3) development and application of models to simulate urban futures; and (4) application of the first three components to societal problems. The San Francisco/Sacramento, Baltimore/Washington, New York, Philadelphia, Chicago/Milwaukee, and Portland/Vancouver regions have historic data undergoing geographic analysis. Different modeling approaches to simulating growth are under development and model application has been achieved for San Francisco, Baltimore-Washington, and Albuquerque. Applications that focus on the accessibility of infrastructure resources, the availability and quality of ground water, the contamination of ecosystems, and changes in riparian habitats have been conducted in several regions. Other urban dynamics activities are underway in Las Vegas, the Middle Rio Grande Basin in New Mexico, the Detroit River corridor, the Front Range corridor of Colorado, South Florida, and Lake Tahoe. The figure below presents areas around the Nation where work is being conducted or planned under this program initiative.



Results of the urban areas studied to date have been beneficial to local, regional, and state officials. Animations documenting past and in some cases potential future urban growth have been produced. These animations have been shown on television, reported on in the popular press, and discussed in professional literature. Several States have used USGS products to demonstrate that better control of rapid urban growth is critical to the future of a region. The data bases built to date contain a wealth of information that have been used by universities and other organizations in studying urban growth and its effects on the environment, ecology, and resources.

FY 2001 Program Change

This increase is part of the Administration's Lands Legacy initiative, State Planning Partnerships program. The additional funding will support the Lands Legacy's objectives, and in particular, help States and communities preserve local lands and habitat. Urban Dynamics will make USGS information and technical expertise available to State and local entities to help them plan for future growth and understand possible changes in their urban and natural environment. It will involve both new research and information analysis completed cooperatively by the USGS and the participating communities, universities, and organizations.

Geographic Research and Applications +\$10.0 million: The USGS will increase its efforts to (1) understand landscape change in large metropolitan regions, (2) assess the impacts of these changes on regional ecosystems and resources, (3) enhance and apply technology for monitoring, analyzing, and predicting rates, patterns, and impacts of landscape changes resulting from natural and human causes, and (4) provide decision makers with accurate data and better understanding for improved decision making, policy, and planning. Integrated scientific investigations of the causes and consequences of urban growth will draw on historical trends that compare the effects of various physical, social, and economic factors on why and how changes in land use types evolve. Hypotheses on what controls growth and what effects growth has on water quality and quantity, land condition, resource accessibility, natural hazard vulnerability, and ecosystem viability, among other things, will be investigated. Historical data sets and the tools and methodologies for their analysis will be transferred to organizations around the country for use in grassroots initiatives focused on urban growth and related issues.

Partners and Customers

Customers for this initiative include local community leaders and decision-makers, State officials, university researchers, community groups, and the public. News organizations and other general publications have also shown a strong interest in the maps and video animations that provide a historical perspective of the urbanization process.

Local and State decision-makers need an integrated environment of decision support tools and scientific information to help them make informed land management decisions. They also need the scientific work that provides an understanding of the impacts of land use change on natural habitats, the environment, local ecology, and other resources. Researchers need the national databases created by this work to conduct further analysis of and correlation to environmental factors. They also use USGS products to produce and calibrate models of future urban growth and its impacts to the environment and resources. Community groups and the public are using temporal data and the increased understanding of land use change to promote their individual initiatives and interests.

Past USGS urban dynamics studies have relied on many different partners. These partnerships typically involve in-kind services and a shared research agenda. For example, for the Baltimore/Washington region collaborators were the University of California-Santa Barbara, the University of Maryland-Baltimore County, NASA, Bureau of the Census, Library of Congress, Smithsonian Institution, and the Maryland Historic Trust.

Products

This initiative will integrate geographic, biologic, hydrologic, and geologic data, information, and knowledge for understanding the dynamics of urban development. The initiative will also provide the spatial databases and earth science data that document the land use history of large metropolitan regions. Other products will include (1) documentation of natural community responses to habitat change, (2) models of the changes in urbanization and the availability of aggregate resources, (3) assessments of the effects of urban sprawl on water quality, water supply needs, and environmental indicators, (4) an interpreted database that objectively sets the baseline for future measurement of habitat change and human demographics/expectations on a landscape scale, (5) development of models of human-environment interactions and effects, and (6) ecological planning and design protocols for expanding and enhancing urban green space, recreational parks, and streetscapes, to their maximum ecological potential.

Accessible Data Transfer

+\$2.0 million

Issue

The Internet has become the delivery mechanism of choice for many USGS customers. In the past 2 years, the number of “hits” on the USGS Home Page has grown 100 percent while the number of users has increased 32 percent. Other USGS Internet sites report similar growth. The TerraServer, a web site developed by Microsoft Corporation in a Cooperative Research and Development Agreement with the USGS, offers USGS image data to the public and receives an average of 5 million “hits” per day.

The USGS network is approaching a time when it will be unable to transfer the data and information necessary to meet the internal needs of scientists and provide the accessibility expected by our customers. The amount and complexity of natural science data is growing explosively. At the same time, rapid development in information technology is allowing for faster delivery of data and information to customers. These changes create a climate of increased expectation by our customers.

The USGS has been so successful in marketing the availability of our natural science data, products, and services on the Internet and through the Department of Interior Network (DOINet) that our networks are now saturated. We have resorted to routing outside customers over our internal network to meet their expectations for around-the-clock, rapid access, and speedy data delivery – which makes USGS data and computer systems vulnerable to security breaches. This is markedly slowing down the network for our own internal research needs.

USGS Role

The mission of the USGS is to serve the Nation by providing reliable scientific information to the public. Today the Internet is a primary means of providing that information. We are uniquely qualified to meet the Nation’s need for natural science information. Our great wealth of information goes back 120 years, much of it is not available anywhere else. Forty long-term national databases are being maintained to hold and disseminate the tremendous amounts of data and information collected and produced by the USGS.

We have a long history of making data accessible, available, and delivering it to customers. Because of our unique federal role, the USGS is positioned to make available or provide access to data and information produced by customers, stakeholders, and others through the National Spatial Data Infrastructure and the National Biological Information Infrastructure. The USGS has achieved significant success in using the Internet to support operations and deliver natural science data and information to the nation. In just 5 years, the USGS placed more than 300,000 pages of information and ten’s of thousands of data sets on the Internet. This is expected to grow rapidly as more current data products and legacy data and information are made available via the Internet.

Current Program

Over 300 USGS offices located in all 50 states and several territories collect, maintain, and archive natural science data and information. Major regional offices in Reston, VA; Denver, CO; and Menlo Park, CA, hold significant amounts of data and information for their region or as part of a national database. The EROS Data Center in Sioux Falls, SD, is the archive for satellite images and other geospatial data and holds over a petabyte of data (a petabyte is 1,125,899,906,842,624 bytes; a petabyte is equal to 1,024 terabytes.). All of these offices are connected to the Internet.

The USGS currently uses the DOI Net for most of its Internet connectivity. DOI Net is the Department of the Interior's (DOI) integrated communications network. It is dedicated to supporting all DOI bureaus, improving bureau communications and reducing DOI's networking costs. DOI Net ensures network compatibility within the Department and access to the Internet. The USGS currently spends about \$2.0 million per year for network connectivity as part of the DOI Net under the terms of GSA's FTS2000 contract. However, DOI's Office of Information Management Resources has determined that DOI Net, as it is currently operated, will no longer be used after fiscal year 2000. Each DOI bureau will be responsible for determining their Internet connectivity and purchase that connectivity under GSA's FTS2001 contract.

FY 2001 Program Change

Science Support +\$2.0 million: In the OhioView pilot project, the USGS learned valuable lessons about delivering natural science data via the Internet. The proposed increase will provide the infrastructure for USGS to more efficiently and expeditiously disseminate scientific information to its customers and to decisionmakers. It is a necessary investment for USGS to expand and replicate the OhioView model and other partnership models to other parts of the country. This initiative will increase network capacity between major USGS offices as they form the primary link between the USGS and the Internet. This will allow the USGS to increase data transfer capacity, improve reliability and speed, for delivery of data, World Wide Web pages, and real-time data to our customers. The USGS will use commercial sources to purchase and lease connectivity between these major sites for Internet connectivity.

Partners and Customers

All USGS customers will benefit from this initiative. Customers want and need the full range of USGS data and information delivered and accessible via the Internet. External customers that currently receive USGS products via the Internet will be better served by the enhancements to network connectivity.

Products

No new products will result from this initiative. However, this initiative will enable the USGS to deliver up-to-date information faster than the current performance.

Landsat

+\$5.0 million

Issue

Landsat, the world's first civil earth-observation satellite program, has provided the United States and international users with a continuous stream of land-image data since 1972. Data from the historical Landsat archive are gaining in scientific and commercial value as changes on the Earth's surface can be identified, compared, and analyzed across 3 decades. These data, both historical and up-to-the-minute, are increasingly depended on by local planners and decision makers for urban growth scenarios applications, for analysis of post natural disasters such as flooding and forest fires, and for targeting scant resources to the most severe areas of coastal erosion. The cloud-free imagery data being acquired now are the premier tool for these applications and for global scientific studies.

USGS Role

In 1994, a Presidential Decision Directive established a Landsat Program Management structure comprising the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), and the Department of the Interior (DOI/USGS). In 1999, these agencies agreed that the Landsat 7 mission should be managed by the Department of the Interior, the Nation's primary land-management agency, through the USGS. To ensure the long-term collection, archive management, and distribution of worldwide image data acquired by Landsat 7, the USGS has assumed NOAA management oversight responsibilities within the Landsat Program, including oversight of U.S. Government access rights to all Landsat data in international cooperator archives. Over time, the best regional archives of Landsat 7 data acquired outside the U.S. will be at international cooperator receiving sites. The USGS will maintain a mutually beneficial working relationship with international receiving stations in order to ensure access, by the U.S. scientific community and others, to seasonal global data sets.

Current Program

With the launch of Landsat 7 in April 1999, the USGS began capturing and processing seasonal global data sets of land image data. In just a few months of data collection, the program has captured cloud free imagery of the entire planet for the first time. Current USGS core mission responsibilities include coordination and management of the Landsat 7 international ground receiving and processing facilities and assumption of NOAA program oversight responsibilities. The USGS is working with NASA in FY 2000 to transition long-term management of the mission, with full USGS responsibility to begin in FY 2001. This transition allows the USGS to conduct an aggressive data collection effort to ensure the key mission responsibility of ensuring comprehensive geospatial data coverage and maintenance of permanent archives.

FY 2001 Program Change

Mapping Data Collection and Integration +\$5.0 million: The recent launch of Landsat 7 will improve the quantity and quality of remote sensing data and greatly expand the applications of this information. To be used effectively, the data need to be received, processed, stored, and available for distribution. As the volume of data and its uses have expanded greatly in the recent past and will undoubtedly continue to expand rapidly in the future, the resources needed to manage the incoming data need to expand in order to keep pace. While approximately half of the Landsat 7 mission annual costs can be recovered through data sales and international receiving station fees, base funding is required to ensure stable program operations over the long term. The \$5 million increase in FY 2001 meets the need for operational stability and will fund a competitively awarded commercial contract to maintain satellite operations.

Partners and Customers

The USGS carries out its Landsat Program Management responsibilities in partnership with NASA. In addition to Federal scientists and land managers, the USGS has traditionally provided thousands of government, corporate, and individual customers across the country and around the world with Landsat data. A pilot program is also in place with a consortium of academic and government agencies in Ohio to provide near-real-time Landsat 7 data on each orbital pass over the entire state, after which consortium members will share and redistribute the data to local users.

Products

The cloud-free and global nature of the data sets serve the needs of national and international land-management and earth-science agencies, State and local government planning bureaus, commercial engineering, mapping and earth-resource companies, and a host of entrepreneurs that exploit satellite image data for many purposes. Also, users can now combine sharper images with many more data sets than in the past, allowing GIS users to derive tomorrow's breakthrough remote sensing products.

